# Update: Development of a WTC Dust Screening Method

U.S. EPA Office of Research and Development and U.S. EPA Region 2

WTC Technical Expert Review Panel Meeting May 24, 2005

#### **Outline**

- Discussion of Screening Methods
- Hypothesis
- Validation of Hypothesis
  - Sample Collection
  - Preliminary Evaluation of Concept
  - Protocol Development
  - Protocol Validation
- Next Steps
- Time Frame

decisions

### WTC Dust Screening Methods

- Residual PAHs in household dust as a result of WTC fires. (WTC Fire Screening Method)
- Residual building components in household dust as a result of the WTC collapse. (WTC Collapse Screening Method)

### WTC Fire Screening Method

- Study has revealed two limitations:
  - The proposed method cannot distinguish between common building fires and WTC fires.
  - 2) There are currently no data indicating how the PAH's suggested for use in this method degrade over time.
- Given these limitations, the EPA has decided to focus its efforts entirely on a collapse method.

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### Hypothesis for WTC Collapse Screening Method

- If a unit has been impacted, those materials that are found in WTC dust (markers) will be found in the dust collected from the unit. The materials under consideration are:
  - 1) slag wool
  - 2) elements consistent with concrete
  - 3) gypsum

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### Hypothesis for WTC Collapse Screening Method

- Since slag wool is a major component of WTC collapse dust, if a sample does not contain 'significant' levels of this marker, the unit would not be considered to contain WTC residuals.
- The other markers would be used to distinguish samples containing non-WTC slag wool from those containing WTC slag wool.

### Validation of Hypothesis

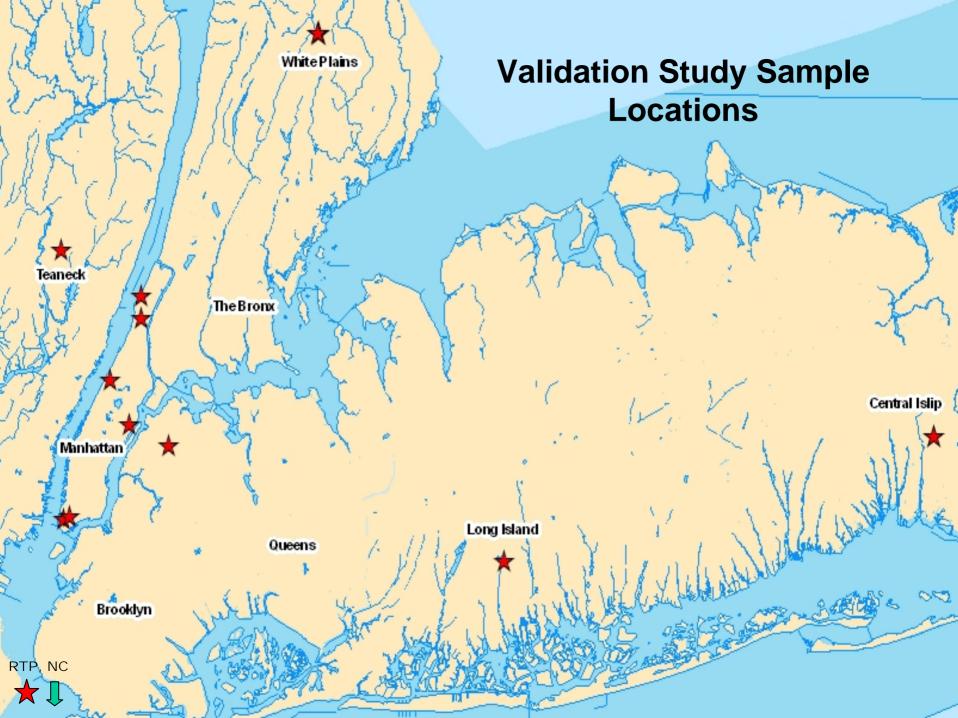
- Sample Collection
  - Collect urban background and WTC affected dust samples.
- Preliminary Evaluation of Concept
  - Potential for the hypothesis to work
- Protocol Development and Validation
  - Develop a definitive and reproducible test method to analyze dust for the components discussed in the hypothesis.
  - Design and conduct a study to validate the screening hypothesis.

### Sample Collection

- Urban background and WTC impacted dust has been collected.
- Three dust collection methods were used:
  - 1) HEPA Vacuum
  - 2) Procurement of vacuum cleaner bags from individuals and maid services (background samples only).
  - 3) Bulk sample collection post-9/11 ('pure' WTC dust only)

### Sample Collection

- 23 Background locations Above 70<sup>th</sup>
   St. in Manhattan, Bronx, Queens, Long Island, and N.J. (50 samples)
- 4 WTC impacted locations next to WTC site (23 Samples)
- 12 of the above samples from different locations with sufficient mass were used for validation study.
  - 10 background
  - 2 WTC impacted (1 from USGS)



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# Preliminary Evaluation of Concept

- 1) Brief study to determine viability of hypothesis
  - 3 commercial labs analyzed 4 samples
     (3 background, 1 spiked with 10% WTC dust) without standard protocol.
  - Results varied between labs due to the lack of a specific analytical protocol.
  - All laboratories found slag wool in WTC dust containing sample.
  - All laboratories found at least one of the secondary markers in the WTC dust containing sample.
  - Observed variability of results indicated need to develop definitive methods for sample preparation and analysis.

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# Preliminary Evaluation of Concept

- 2) As part of the subsequent method development effort;
  - 9 WTC impacted dust samples (3 locations including USGS collected samples) and 32 background samples (16 locations) were analyzed by EPA for slag wool.
  - Method progressed during the course of the analysis so sample concentrations may not be directly comparable.
  - Slag wool was higher in samples from impacted locations.
  - Although the results are preliminary, EPA believes they support the further development of a WTC screen.

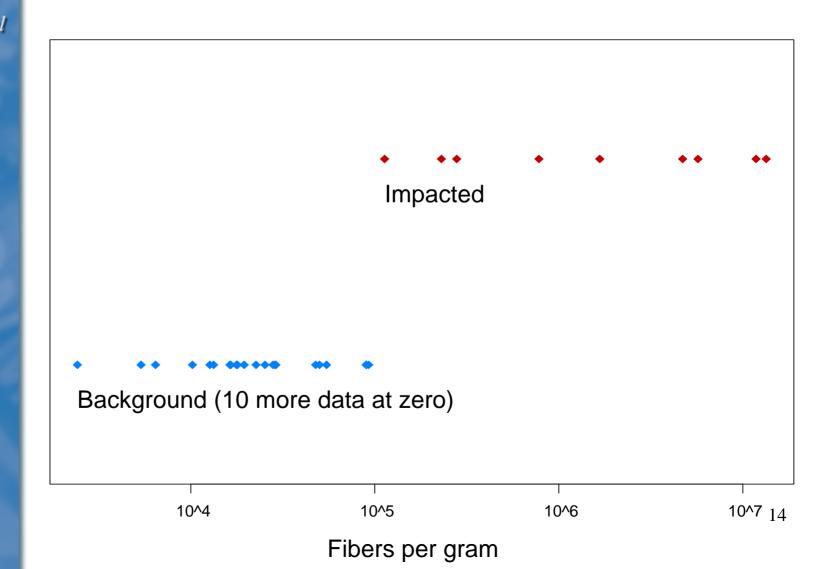
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### Preliminary Slag Wool Data: Fibers/Gram Dust

Impacted Sites (n=9)	Background Sites (n=32)			
13,400,000	92,800	25,300	10,200	0
11,800,000	90,000	22,600	6,430	0
5,700,000	89,600	19,500	5,370	0
4,710,000	54,700	17,900	2,420	0
1,670,000	50,000	17,700	0	0
779,000	47,700	16,500	0	
279,000	29,000	16,300	0	
230,000	28,700	13,300	0	
113,000	28,000	12,700	0	1

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### Preliminary Slag Wool Data



### Comparison

- Visual inspection suggests 'impacted' data are different from the 'background' data.
- Kruskal-Wallis Rank sum test shows significant difference among the two groups.

### Protocol Development

- 1. Based on USGS and EPA work, a draft analytical protocol was developed.
- 2. EPA, USGS, and microscopy experts met to discuss and refine protocol.
- 3. Modified protocol provided to the WTC Panel Signature Subgroup for review.
- 4. Comments from the Subgroup were considered and the protocol revised.
- 5. Final protocol provided to the labs conducting the validation study.

#### **Protocol Validation**

- Five commercial labs and two government labs (EPA and USGS) are conducting the validation study.
- All labs received 32 blind samples.
  - 10 background samples and duplicates
  - 6 WTC dust dilutions (2 WTC samples) and duplicates
- Labs are using the final protocol to analyze the samples.

### **Next Steps**

- Once received, final results will be evaluated to determine study success.
- Success will be based on:
  - Labs producing comparable results for each sample.
  - Sensitivity of screening method (at least sensitive enough to distinguish 10% WTC dust from background).
  - Number of false positives (<10%)</li>
  - Minimal analytical problems.
  - Ability to produce timely results.

### Next Steps

- Study design and results will be subjected to external peer review by independent experts who have not been involved with the program.
- As a result of this peer review process, the study will be finalized.

RESEARCH & DEVELOPMENT

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### Timeframe Based on Current Study Status

- Inter-lab study expected to be complete by June 30, 2005.
- External peer review to be conducted concurrent with study.
- Final results of study and peer review expected to be provided by mid-Summer.